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Attentional and Judgement Biases Associated With Body Weight Preoccupation in Children and Adolescents.

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ATTENTIONAL AND JUDGEMENT BIASES ASSOCIATED WITH BODY WEIGHT PREOCCUPATION IN CHILDREN AND ADOLESCENTS

A Dissertation

Submitted to the Graduate Faculty of
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Doctor of Philosophy

in

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ABSTRACT

Most cognitive behavioral theories of the eating disorders emphasize the influences of beliefs and attitudes related to body weight and shape on the development and maintenance of pathological eating and weight control behaviors. Recent research has found support for the theories and specifically for the presence of attentional, judgement, and memory biases in individuals diagnosed with eating disorders as well as women who are preoccupied with body weight (Williamson, Muller, Reas, & Thaw, 1999). This research has focused almost without exception on adult populations. However, eating disorders as well as preoccupation with body size and shape have increased in preadolescent and adolescent girls across the last few decades (Rolland, Farnill, & Griffiths, 1997; Feingold & Mazzella, 1998). The purpose of the present study was to apply methodologies used to assess biased attentional and judgement processes in adults to children and adolescents. Participants included 98 female children aged 9 to 15 years who completed an ambiguous homophones task assessing judgement biases to body, shape, and weight information as well as an emotional Stroop task modified specifically to assess body and weight attentional biases. Body shape concerns were associated with biased processing on the homophones task specific to negative body shape related information. An attentional bias was not found using the Stroop task. A reference group of 65 college-aged females also completed the experimental protocol. This group was included as a test for the homophones and Stroop task as both tasks have been used to find biased processing in this age group. Results for both tasks were consistent with previous research. The results are discussed in the context of the developmental processes underlying cognitive biases in psychological disorders.

CHAPTER 1. INTRODUCTION

Bulimia nervosa and anorexia nervosa are psychiatric disorders characterized by pathological eating and weight control behaviors. The *Diagnostic and Statistical Manual*, Fourth Edition (DSM-IV; American Psychiatric Association, 1994) criteria for bulimia nervosa include the following: (1) Recurrent binge eating episodes in which more is consumed that the average person would eat in a specified time period with concomitant feelings of "loss of control;" (2) recurrent episodes of inappropriate compensatory episodes (i.e., self-induced vomiting, excessive exercise, laxative abuse, etc.); (3) binge eating and compensation occur at least two times per week for three weeks; (4) self-perception is strongly influenced by shape and body weight. A diagnosis of anorexia precludes the diagnosis of bulimia nervosa and includes the following: (1) Refusal to maintain minimal normal body weight (i.e., below 85% of ideal body weight); (2) weight preoccupation or fear of weight gain; (3) distorted body image; and, (4) amenorrhea in females for at least three consecutive menstrual cycles (American Psychiatric Association, 1994).

The presence of body image distortion and intense preoccupation with body weight or shape are required for a diagnosis of these eating disorders (American Psychiatric Association, 1994). According to cognitive behavioral theories of eating disorders, negative beliefs related to body weight and shape are critical to the development and maintenance of pathological eating and weight control behaviors. Research has found support for biased information processing in studies of memory, judgement, and attention. Cognitive biases have been found in clinical eating disordered populations as well as nonclinical populations including female dieters and in women

who are weight preoccupied (Cooper, 1997; Williamson, et al., 1999). Few studies have focused on children and young adolescents. However, weight preoccupation, dieting, and clinical eating disorders have become increasingly common among preadolescents over the last few decades (Rolland, Farnell, & Griffiths, 1997). Developmental theories of cognitive differences in psychopathology suggest that children as young as seven years of age have developed adequate cognitive complexity to exhibit biased processing similar to that found in adults (Vasey, Crnic, & Carter, 1994). These biases have been found in clinically anxious children of that age group for anxiety related material (Hadwin, Frost, French, & Richards, 1997). As suggested by developmental cognitive theories of psychopathology and also suggested by the research findings, weight preoccupation in children and adolescents might be associated with the types of cognitive biases found in weight preoccupied adults.

The present study investigated judgement and attentional biases for body weight and shape information in children and adolescents using an ambiguous homophone task and the emotional Stroop task, respectively. It was hypothesized that level of weight concerns would be associated with biased processing on both tasks. For the purposes of this paper, the terms weight concerns and weight preoccupation will be used interchangeably to refer to worries about weight and shape as well as preoccupation with weight loss and means to lose weight or to maintain a thin body shape. This introduction will also review relevant research on the cognitive theories of eating disorders, epidemiology of eating disorders, and risk factors for the development of weight concerns and eating disorders.

CHAPTER 2. REVIEW OF LITERATURE

Eating Disorders, Weight Preoccupation, and Childhood

Bulimia nervosa and anorexia nervosa occur in approximately 1-5% of American females (American Psychiatric Association, 1994). The average ages of onset for these disorders range from early adolescence for anorexia nervosa to late adolescence/early adulthood for bulimia nervosa (Treasure, 1991). Recent research has suggested that the prevalence of eating disorders has increased across the last few decades (Crago, Shisslak, & Estes, 1996).

Research also suggests that the negative attitudes related to weight preoccupation and desire for weight loss are present in girls beginning at a very young age. Approximately 9% of 9 year-old females have reported using self-induced vomiting for weight maintenance or weight loss while 31% of 10 year-olds report fear of becoming fat (Johnson, Tobin, & Lipkin, 1989). Of female children between the ages of 8-10 years, 28% report that they have tried dieting to lose weight, and 59% state that they used exercise to change body shape (Rolland, Farnill, & Griffiths, 1997).

Risk factors associated with the onset of pathological weight control behaviors in sixth and seventh grade girls include early maturation, higher than average weight, fear of weight gain, and mood disturbance (Killen, Hayward, Wilson, Taylor, Hammer, Litt, Simmonds, & Haydel, 1994; Veron-Guidry, Williamson, & Netemeyer, 1997). The development of disordered eating patterns seems to be mitigated by changes in body shape and fat distribution associated with the onset of puberty (Killen, Hayward, Litt, Hammer, Wilson, Miner, Taylor, Vrady, & Shisslak, 1992). Level of body fat changes from a level of 8% prepubescent to approximately 22% after the onset of puberty

(Brooks-Gunn & Peterson, 1983). Brooks-Gunn and Peterson (1983) also reported that each progressive stage of pubertal development in young women has been associated with increased desire to be thinner and increased body dissatisfaction. Attie and Brooks-Gunn (1989) reported that preadolescent girls who were dissatisfied with their bodies and highly weight conscious were at an increased risk of developing eating problems. In many participants, this increased risk was associated with the symptoms of depression. A four year prospective study found that girls in the upper quartile of a weight concerns measure had an increased incidence of partial or full eating disorder symptoms developing by age 17, while no girls in the lower quartile developed eating disorder symptoms during that period (Killen, Taylor, Hayward, Haydel, Wilson, Manner, Kraemer, Blair-Greene, & Strachowski, 1996).

Cognitive Behavioral Theories and Research Implications

One focus of cognitive behavioral theories is the influence of cognition upon the development and maintenance of pathological eating and weight control behaviors, in particular, the effect of mood state and personality traits on processing of emotional material (Rusting, 1998). Cognitive trait theories emphasize the influence of long-standing patterns of thought called schemata on the development of psychopathology. Schemata are the highly-organized content-relevant knowledge structures that guide information processing. Individuals with eating disorders are believed to possess a schema organized specifically around body, shape, and weight issues. Schemata are theorized to greatly enhance processing at the expense of biasing judgment, memory, and attention in favor of the schematic theme. Vitousek and Hollon (1990) suggested

that biases in thinking are the core psychopathology of eating disorders and account for the persistence of anorexia and bulimia nervosa.

In contrast to the trait schemata theory presented above, Bower's emotional network theory explains emotional processing with a focus on negative mood states, rather than trait schemata. Bower theorized that the mind consists of associated emotion nodes (Bower, 1981). Each node represents an emotion and are connected to physical and mnemonic indicators such that a specific situation may activate another node, activate an emotion, and/or bias the individual toward a particular emotional response (Bower, 1991). This activation spreads across levels of cognitive functioning including attention, judgement, and memory. Thus, an individual in a negative mood may be biased negatively in judgement, attention, and memory.

Research has supported both of these theories in part; however, the best explanation for the data has been an integration of these theories. Rusting (1998) described the mediational cognitive theory in which personality traits predispose for the development of emotional processing while under the stress of negative emotional mood states. As applied to eating disorders, negative body image could predispose an individual to content specific emotional processing specifically during a period of depressed mood. The following section will discuss the findings in this area of research in the context of the mediational theory.

Predictions of the Cognitive Behavioral Theories

Memory Biases

Cognitive behavioral theories of eating disorders predict that weight/body shape related information will be more readily encoded in memory or accessed at recall.

Baker, Williamson, and Sylve (1995) examined recall and recognition in body dysphorics using a self-referent task and positive thin (i.e., slim, figure), negative fatness (i.e., weight, thigh), neutral, and depressive words. Body dysphoria was defined as extreme body dissatisfaction associated with body shape and weight common in normal weight females and is defined by scores in the upper quartile of the Body Shape Questionnaire (BSQ; Williamson, et al., in press; Cooper, Taylor, Cooper, & Fairburn, 1987). Using free recall, the authors found that body dysphoric women had increased recall for fatness words but recalled fewer thinness words than the low body dysphoria group. The authors found no differences in memory using a word recognition task.

Sebastian, Williamson, and Blouin (1996) also used a self-referent task to investigate the presence of a memory bias for fat-related words in eating disorder, body dysphoric, and normal control females. Participants were presented fatness, neutral body related, and neutral words. The eating disorder group evidenced significantly increased recall for fatness words only. No other group differences were found.

Watkins, Martin, Muller, and Day (1995) also found a memory bias specific to body shape and weight relevant objects presented in an office setting. Participants were left for 45 seconds in an office containing normal office items, food-related items, body-related items, and non-office characteristic times. Results indicated that high body dysphoric women recalled more body related items using a free recall task than did the low body dysphoric women. No other group differences were found.

These studies employed explicit memory tasks to investigate a memory bias in eating disorders. Herman, Pieters, and Eelen (1998) contrasted both explicit memory and implicit memory tasks with anorexic and nondieting control subjects. Participants

were shown four types of words (i.e., anorexia related, positive, negative, and neutral) and recall was tested with either the explicit memory task (cued recall) or an implicit memory task (word stem completion task). Findings indicated an explicit memory bias for anorexia-related words in anorexics versus the nondieting control group. However, the researchers failed to find an implicit memory bias using the word completion task.

Attentional Biases

Cognitive behavioral theories also predict biased attentional processes for body and weight related stimuli (i.e., that attention is selectively biased for increased sensitivity to relevant body and shape related information). This bias contributes to the maintenance or development of eating disorder or weight preoccupation as relevant information will preempt all other information in attention (Cooper, 1997).

The methodology that has predominated attentional bias research concerning eating disorders and most other psychopathology is the emotional Stroop task (Mathews & MacLeod, 1985). The Stroop task consists of "color" words written in colored inks. Participants exhibit naming interference for words and color inks that do not agree (i.e., the word "blue" written in red ink is named more slowly than "red" written in red). This effect is usually explained through attentional processes; the conflicting information of contrasting ink color and color word "catch" attention and require increased processing before a response is produced. Researchers hypothesized that emotionally relevant materials, in addition to conflicting information, may cause increased delay. Interference effects of the emotional Stroop have been found in high trait anxious individuals, body dysphoric women, women with eating disorders, and dieting individuals for content-relevant words (Williams, Mathews, & MacLeod, 1996;

Williamson, 1996). The traditional methodology for the emotional Stroop with clinical and nonclinical eating disordered populations have utilized a mixture of food and body shape relevant words (i.e., cakes, diet, fat, etc.). Using this method, color naming interference was found in bulimic subjects, anorexics, and eating disorder symptomatic dieters (Cooper, Fairburn, 1992, Fairburn, Cooper, Cooper, & McKenna, 1991).

Other researchers have suggested that information processing biases may be more specific, requiring a separation of body and weight related words from food words. Research indicates that anorexics may be more sensitive to food related information while bulimic and relevant nonclinical populations may attend more selectively to body shape and weight related words (Channon, Hemsley, & DeSilva, 1988; Mahamedi & Heatherton, 1993; Green & McKenna, 1993; Perpina, Hemsley, Treasure, & DeSilva, 1993). This difference may be related to the effects of starvation which increase the salience of food-related information. Color naming interference of food words has been correlated with level of hunger and appears in normal male and female subjects after only a short period of fasting (Channon & Hayward, 1990).

The presence of an attentional bias in eating disorder has been demonstrated using other methodologies. Schotte, McNally, and Turner (1990) used dichotic listening of weight-related and neutral passages with bulimic women and controls. Subjects were instructed to attend to an innocuous passage one headphone while body and weight related information through the other headphone. Bulimic participants were less able to block the body related information which they were instructed to ignore than were normal controls. Similar findings were obtained using a perceptual identification task (Fuller, Williamson, & Anderson, 1995). Body size words, food words, and control

words were presented for .33 seconds via computer. The high body dysphoric participants more accurately detected food and body size words. Using a similar lexical decision task, Green and Rogers (1997) found that restrained eaters identified body shape words more quickly than affectively neutral words. Also, lexical decision times to the body related words were significantly associated with level of body dissatisfaction.

Judgement Biases

Cognitive behavioral theories also predict the occurrence of interpretational biases related to body and shape issues. Watkins, Martin, Muller, and Day (1995) found evidence for interpretational biases in body dysphoria using an ambiguous homophones task. The researchers presented ambiguous homophones that had both body shape and neutral interpretations to high and low body dysphoric females. Homophones are words that have multiple meanings or spellings, but one sound. For example, "bear" and "bare" are homophones. For the purpose of this area of research, the term "homophones" is also used to describe words with one spelling and multiple meanings (i.e., bat). After each word presentation, the participants were asked to write sentences containing the words. Participants high in body dysphoria were found to give more body and shape related interpretations in the sentences than did low body dysphoric women. Jackman, Williamson, Netemeyer, and Anderson (1995) studied content relevant judgement biases using an ambiguous sentence presentation task. The audio taped stimuli included sentences relevant to weight, shape, and health concerns. Following the presentation, the participant's interpretations were tested using a memory task. Results indicated that high body dysphoric women interpreted the ambiguous sentences with a fatness meaning while low body dysphoric women tended to interpret

the sentences with a bias toward a thinness meaning. Williamson, Perrin, Blouin, and Barbin (in press) found similar results for sentence interpretations using women diagnosed with eating disorders.

Summary of Research Findings

Research has supported the existence of memory, judgement, and attentional biases associated with eating disorders. These biases have been found in clinical samples of anorexic and bulimic participants, but have also been found in nonclinical populations (i.e., dieters, body dysphorics, etc.). Research on cognitive biases predicted from the cognitive behavioral theory for eating disorders has focused almost exclusively on symptomatic eating disorder participants or adult weight preoccupied females. However, the risk factors research also suggests that children can develop extreme weight concerns and body dissatisfaction and that these attitudes can contribute to the development of pathological eating behaviors later in life.

Psychopathology, Children, and Cognitive Biases

Theories of the development of psychopathology in children have rarely focused on the role of cognitive processing. Exceptions to this conclusion are theories of anxiety. Vasey, Crnic, and Carter (1993) proposed that a fundamental characteristic required in anxiety is the ability to anticipate the future. These authors found that by age 8, children are able to anticipate the future and to elaborate on personal effects of negative outcomes. Research has also supported the existence of cognitive biases in anxious children. Using an ambiguous homophones task, Hadwin, Frost, French, and Richards (1997) found evidence for a judgement bias in anxious children. Hadwin et al. (1997) auditorily presented words with both threat-related and neutral interpretations

(i.e, weak/week) as well as neutral words to 40 children ages 7 to 9. Level of anxiety as measured with a self-report measure was a significant predictor of threat interpretations of the threat homophones measured by choice between two pictures representing the multiple meanings. In a similar methodology, Muris, et al. (2000) found that general anxiety level predicted anxious responses to stories with ambiguous anxious content. Even though the stories were specific to type of anxiety (i.e, social anxiety, separation anxiety, and generalized anxiety), it was the general level of anxiety that predicted the responses, regardless of clinical or subclinical symptoms of anxiety disorders.

The ambiguous sentences methodology has also been used in several studies to establish the presence of content specific interpretive biases in trait anxious adults (e.g., Mathews, Richards, & Eyesenck, 1989). The method has also been used to establish the existence of judgement biases with level of sadness (Halberstadt, Niedenthal, & Kushner, 1995) and also with chronic pain patients (Pincus, Pearce, & Perrott, 1996).

A second methodology that has been used to investigate interpretive biases in anxious children is the emotional Stroop task. Martin, Horder, and Jones (1992) found that spider phobic children ages 6-13 exhibited greater color naming interference for the spider related Stroop card than for the nonwords, color words, and control word cards. This disruption did not differ relative to age indicating that the cognitive effects of emotional disturbance, at least in anxiety, emerge at a young age. It is important to note that these authors modified the Stroop task to be more age appropriate. The methodology was adapted for use with children by limiting word repetitions per card to a total of 36 presentations versus the usual 100 presentations.

One study has examined cognitive biases specific to body shape and weight concerns with young children. Green and McKenna (1993) studied the reactions of male and female children ages 9, 11, and 14 to the emotional Stroop task containing body shape, food related, and neutral word cards. Level of weight concerns present in these children was not assessed. No differences were found with the 9 and 11-year old participants; however 14-year-old females did exhibit significantly increased response latencies on body shape related words in contrast to the neutral words. This difference was not found in males in the same age group. It is important to note that although the researchers tested children as young as 9 years old, they did not modify the emotional Stroop task in any way. All children were presented stimuli cards for body shape, food related, and neutral words; each card had 100 colored words. Overall, younger children were slower than the older children; however, the task itself may have been inappropriate to the attentional restrictions of that age group.

A New Area of Interest

The present study investigated the presence of content specific attentional and judgement biases in children and the relationship of these biases to level of weight concerns. Methodologies include the ambiguous homophones task as well as the emotional Stroop task. Both of these methodologies have been used with children in previous studies and using both will allow assessment of both judgement and attentional biases. These tasks were adapted for use with children and are specific to body shape and weight attitudes. Female children grades 4th through 9th were tested in a group format using the homophones task and the Stroop task. Several self-report measures of body shape preoccupation were also be given. A range of ages was included in order to

contrast older children with the younger children. Lower and upper limits were chosen in order to guarantee an adequate representation of both prepubescent and pubescent females. The average age of pubertal onset is 12 years old with a range of approximately +/- three years (Brooks-Gunn & Petersen, 1983). Although puberty is multistaged, the children were assessed only for presence of menarche as college and elementary school officials deemed an in-depth assessment unacceptable. Another reason for age restrictions is that the measures to be included in this study have been found to be less reliable below the age of eight (Rolland, Farnill, & Griffiths, 1997). A reference group of 65 college-aged females were also tested with the same protocol used for the children. This group served as a reference for the cognitive tasks since multiple studies have found specific judgement and attentional biases with this age group using the stated methodologies. Weight, height, and reading comprehension levels were also be recorded. Past studies assessing children and weight concerns have also assessed mood and self esteem; however, the purpose of the present study was not to create a risk factors model but was to assess cognitive biases in children so mood was not assessed.

The main hypotheses for the present study were as follows: (1) Hypothesis #1 is that measures of body shape concerns will be moderately to highly correlated in both samples; (2) hypothesis #2 is that age and pubertal status will be associated with level of body shape preoccupation with the sample of children; (3) hypothesis #3 is that biased processing on both the Stroop and the homophones tasks will be associated significantly with level of body shape preoccupation in the sample of children and in the sample of college students; and, (4) hypothesis #4 is that age and pubertal status will be

associated with biased processing on the Stroop and homophones tasks in the sample of children. Also, as part of hypothesis #4, age and body shape preoccupation are proposed to be associated with biased processing on the Stroop and the homophones tasks across the full sample.

CHAPTER 3. METHODS AND MATERIALS

Method

Participants

Participants included 107 female children in grades four through nine. Nine children did not complete the entire study and were excluded from the data analysis. Child participants were recruited from the Louisiana State University Laboratory School. Exclusion criteria for these children were children below the age of nine as well as children whose parents did not agree to allow them to participate. Low reading level as evidenced by failure on the Language Scale of the Louisiana Educational Assessment Program were an exclusion criteria. This information was obtained from school files. No children were excluded due to failure on the LEAP test. Children admitted into the study during the Spring semesters of two academic years. Seventy-three female college students were also run as a reference group. Of these 73 students, eight did not complete the entire study and were excluded from the data analysis. These participants were recruited through screening of undergraduate psychology courses at Louisiana State University. Exclusion criteria included age below 18 years and male gender.

Assessment Measures

Body Image Assessment (BIA). Three versions of the BIA were used including, a.) the BIA for adults (BIA-A), b.) the BIA version for children (BIA-C), c.) and, preadolescents (BIA-P) (Williamson, Davis, Bennett, & Gleaves, 1989; Veron-Guidry & Williamson, 1996). The procedure consisted of nine silhouette cards. The female body silhouettes ranged from very thin to obese (See Appendix A). Instructions were identical for all versions. The BIA procedure involved placing the nine cards before the

subject in a random order. The subject was first given the following instructions: "Please look at all of the cards and point to the one that looks like you do right now. Pick only one card." The response was recorded and the cards were shuffled and replaced in random order. The subjects were then asked to indicate the card that "...looked like the one they would most like to look like. Pick only one card." The first response corresponded to Current Body Size (CBS) while the second corresponded to Ideal Body Size (IBS). Scores were converted to t scores. The adult BIA was administered to the college sample while the child BIA was administered to children ages 9-10 and preadolescent version to children ages 11-13 (Veron-Guidry, Williamson, & Netemeyer, 1997). Ninth graders over the age of 13 received the BIA adult version. Each BIA version has age appropriate norms that were used to standardize the scores of the different versions of the BIA. BIA scores were converted to t scores based upon age appropriate norms. A BIA difference score equaling CBS-IBS were also be computed. This discrepancy score is hypothesized in research to represent a measure of body size dissatisfaction (Williamson, et. al., 1989). A negative BIA difference score indicates a preference for a thinner body size in comparison to rating of own body size.

Body Mass Index (BMI). BMI has been validated as an index of adiposity (BMI=Weight in Kilograms/Height in Meters; Billewicz, Kemsley, & Thomson, 1962). Normal weight range is 20-25. Weight was measured to the nearest .01 using a digital scale while height was measured to the nearest centimeter.

Children's Eating Attitudes Test (ChEAT). This is A 26-item adaptation of the adult Eating Attitudes Test, a self-report measure of eating attitudes, dieting behaviors, and weight preoccupation (Garner & Garfinkel, 1979). A ChEAT score one standard

deviation above the mean has been found to indicate at-risk status for the development of eating disorders (Maloney, McGuire, & Daniels, 1988). The ChEAT has shown adequate test-retest and internal reliabilities with American, Israeli, and Australian children (Maloney et al., 1988; Rolland, Farnill, & Griffiths, 1997). A factor analysis of the ChEAT revealed four factors (Williamson, DeLany, Bentz, Bray, Champagne, & Harsha, 1997): (1) Dieting (e.g., "I have been dieting."); (2) Overconcern with Eating (e.g., "I think about food a lot of the time"); (3) Social Pressure to Gain Weight (e.g., "I feel that others would like me to eat more."); and (4) Extreme Weight Control Practices (e.g., I vomit after I have eaten). The final factor, which consists of five items was eliminated from the questionnaire because of school and university concerns about the content of the items. The modified 21-item ChEAT is included in Appendix B. ChEAT reading level was analyzed using Grammatik Wordperfect 7.0 software (Wordperfect 7.0, 1996). Instructions and items were at the first grade reading level.

Weight Concerns Measure. This instrument includes five items focusing upon participant's fear of weight, worry about body shape, weight concern, and dieting history. Psychometric research has indicated that the measure has adequate validity and good test-retest reliability (test-retest correlation for 7 month period=.71; Killen, et al., 1994). The measure has been validated with children as young as 11 years of age and reading level is at, approximately, the second grade level. The measure is included in Appendix C.

Body Shape Questionnaire (BSQ). This 34 item self-report questionnaire has been found to be a valid and reliable measure of weight concerns (Cooper, Taylor, Cooper, & Fairburn, 1987). It was administered to college participants only (See Appendix D).

Materials

Study Materials

Stroop Task. The modified Stroop task consisted of color naming of three word cards. The practice card consisted of "OOOOO" presented 40 times in a 4 X 10 matrix equally in blue, red, green, or purple ink. The shape and shape control cards consisted of five body shape/weight words and five control words, respectively, presented each eight times randomly in the same manner as the practice words. Presentation of the shape and shape control cards was counterbalanced. Participants were instructed to name the ink color of each word out loud as quickly and as accurately as possible. Reaction time in tenths of a second and errors in color naming were recorded. Words are included in Appendix E.

Homophones Task. Eight body relevant homophones were presented via audio tape. Five practice words were presented first, then the body shape relevant homophones were presented randomly along with 16 neutral filler words of similar length. Word lists were included in Appendix F. Subjects were instructed to write down each word they heard, then write that word in a sentence. The words were presented, and participants were given five seconds to write the word. They were reminded to write a sentence including the word and were given 40 seconds to complete that task. Each word was preceded by a prompt. Three randomized versions of the audiotape were constructed to control for order effects.

Word Lists. Body shape word lists for the Stroop and homophones task were chosen for familiarity of alternative meanings to the youngest age group (i.e., 9 year-olds). Familiarity to this young population was assessed in a pretest that is fully explained at

the end of this paper. For the purpose of the homophones and Stroop tasks, the final target word sets were matched for frequency using Francis and Kucera (1983) norms for English language word frequency and word length with control sets. Again, these sets were chosen from prior published research that used neutral control word sets. The homophones neutral control list was chosen from Hadwin, et al. (1997). Sixteen words were chosen and matched to body shape list. Neutral words are matched to both the target and neutral meanings of the ambiguous words. The Stroop control sets were chosen from control word list used in Green and McKenna (1993) with 9 to 14 year-olds. Word lists were chosen based upon a pretest. Materials and data from this pretest are presented in Appendices K and L.

Demographics Sheet. This sheet included questions about age, grade, race, and birth date. This sheet was included on the cover of the study packet (See Appendix G).

Puberty Questionnaire Sheet. This questionnaire was completed during or after weigh-in by the subject and included two questions about the onset and regularity of menstruation. This sheet contained an area for the recording of height and weight measures as well as calculation of BMI (See Appendix H). Adult participants did not fill out this questionnaire.

Vocabulary Knowledge Filler Task. The filler task consisted of 13 fill-in-the-blank vocabulary questions. Word lists and questions were provided by Ferreira and Cutting (1997). This task was constructed solely to keep the children busy while participants were being weighed and while they were completing the Stroop task (See Appendix I). The results were not used in analysis.

Reading Comprehension Information. Reading comprehension was assessed and controlled using data from yearly achievement test administration. The Louisiana school system mandates administration of the Louisiana Educational Assessment Program (LEAP) language test on alternating grade years. The LEAP provided a "passing" score that was a measure of inclusion. Permission to gather this data from school records was obtained through the parental informed consent form.

Procedure

Packets containing materials for parental consent as well as explanation of the present study were sent home with students. These materials are included in Appendix J. Those who agreed to participate were gathered on test day. Experimenters handed out packets. Each packet was numbered. This number was used as the subject number. Participants were explained the study and asked to complete the informed assent. Participants then completed either the Stroop task or the homophones task. These tasks were counterbalanced across class groups in order to minimize task carryover effects. Administration of different homophones lists were also counterbalanced separately across class groups.

The homophones task was completed as a group while the Stroop was completed individually. To complete the Stroop, participants were taken from the classroom. If the homophones task was completed first, individuals completed the BIA, the puberty questionnaire, and height and weight was measured when they were taken from the classroom for the Stroop. While individuals were completing the Stroop task, the group remaining in the classroom completed a filler vocabulary test and a demographics sheet. Those who completed the Stroop and the filler task were

administered the ChEAT and the Weight Concerns measure. When the Stroop was given before the homophones task, participants completed the filler task and demographics as they returned. Then, the homophones task was given and the questionnaires completed as participants were weighed and height was measured. Participants were thanked for participation and released. After participants completed the study, reading comprehension data was gathered from the school. After this data was gathered, names were removed from the data and only subject numbers were used to identify the individual subject.

The child and adult protocols differed in several ways. First, the adult participants aged 18 years or older so parental consent was not required. Reading comprehension and pubertal onset data were not gathered. Adult participants were administered the BSQ, the Weight Concerns measures, and the BIA-A. Height and weight were measured for the calculation of BMI.

CHAPTER 4. RESULTS AND DISCUSSION

Analysis results and discussion will be included in this chapter. First, demographics will be presented for the child sample and then for the sample of college students. After the presentation of group characteristics, the analysis results will be presented separately for each hypothesis. As a reminder, the hypotheses are as follows: (1) Measures of body shape concerns will be moderately to highly correlated in both samples; (2) age and pubertal status will be associated with level of body shape preoccupation with the sample of children; (3) biased processing on both the Stroop and the homophones tasks will be associated significantly with level of body shape preoccupation in the sample of children and in the sample of college students; and, (4) age and pubertal status will be associated with biased processing on the Stroop and homophones tasks in the sample of children. Age and body shape preoccupation will also be associated with biased processing on the Stroop and the homophones tasks across the full sample. Finally, results will be presented for analyses of order effects and of ethnicity in the entire sample.

Group Characteristics for Each Sample

Demographic information as well as the body shape preoccupation measures is presented in this section. Information is presented individually for the sample of children and for the sample of college students.

Group Characteristics of Children Grades 4th Through 9th

Ninety-eight children between the ages of 9 and 15 years were included in the analysis. Ninety-seven of these participants had complete data. One child did not complete the entire homophones task, but she was included because her data were

otherwise complete. Missing data in the child and adult samples will be replaced using the appropriate sample means (Hinkle, Wiersma, & Jurs, 1994). Table 1 presents the grades and ages of these children.

Table 1

Child Sample: Frequency Distribution for Age

Age	N
9	4
10	15
11	19
12	19
13	15
14	20
15	6
Total	98

Because of the time of year the children completed this study, the 9 year-olds and the 15 year-olds were 2 to 3 months from being 10 and 14, respectively. The following describes the self-identified racial make-up of this group: 67.7% Caucasian, 24.6% African American, 6.2% Asian, and 1.5% Other. Means for BMI, BIA (t scores for current and ideal), ChEAT total score, and Weight Concerns measures by age are presented in Table 2. BMI is age dependent and the actual values cannot be directly interpreted. ChEAT subscale scores means and standard deviations are also provided in Table 3.

Table 2

Demographics and Body Concern Measures Means and Standard Deviations for Child Sample

Age	BMI	TCBS	TIBS	ChEAT	WC
9	15.49(2.1)	53.1(11.5)	51.3(10.2)	4.0(4.9)	9.75(4.0)
10	18.6(2.4)	52.4(12.0)	50.9(13.2)	6.1(4.3)	10.4(5.0)
11	19.8(4.0)	54.4(8.9)	53.1(8.8)	8.8(8.9)	11.8(4.0)
12	20.5(3.2)	50.4(9.8)	51.8(11.3)	8.3(8.4)	12.3(6.4)
13	22.06(3.2)	57.0(10.3)	65.3(10.9)	7.1(7.9)	12.0(6.3)
14	21.2(3.0)	49.9(11.7)	53.3(12.6)	10.2(8.7)	12.9(6.1)
15	19.2(2.0)	53.5(12.3)	53.0(21.2)	12.3(9.3)	17.2(7.5)

Note. BMI stands for Body Mass Index; TCBS is the t score for Current Body Size BIA; TIBS is t score for Ideal Body Size; ChEAT is the ChEAT total score; WC is the Weight Concerns measure. Standard deviations are included in parentheses.

Table 3

Means for Subscales of the ChEAT by Age in Child Sample

Age	Dieting	Overconcern	Social
9	1.8(3.5)	.75(1.5)	1.5(3.0)
10	2.1(3.5)	.33(.61)	1.5(2.5)
11	3.7(4.5)	1.6(2.6)	1.3(2.2)
12	4.4(5.3)	1.8(2.5)	1.2(1.8)
13	3.4(3.9)	1.1(1.7)	1.1(2.5)
14	5.8(5.4)	1.3(2.8)	1.1(1.7)
15	5.8(6.1)	3.7(2.6)	.83(2.0)

Note. Full names of subscales are as follows: Dieting, Overconcern with Eating, and Social Pressure to Gain Weight. Standard deviations are included in parentheses.

Pubertal onset, pubertal onset age, and months since onset of menses by age are presented in Table 4. Zero percent of 9 and 10 year-olds self-reported the onset of menses. Percentages for remaining age groups are as follows: 11 year-olds, 10.5%, 12 year-olds, 47.4%, 13 year-olds, 93.3%, 14 year-olds, 100%, and 15 year-olds, 100%.

Table 4

Means from Pubertal Onset Questionnaire

Age	Onset N	Age of Onset(Yrs)	Months Since Onset(Months)
9	0	*	*
10	0	*	*
11	2	11.0(1.0)	.79(2.3)
12	9	10.8(1.5)	7.1(12.5)
13	14	11.8(.89)	14.5(9.0)
14	20	12.5(.88)	22.3(11.3)
15	6	13.5(1.0)	20.3(14.6)

Note. * indicates no cases present. Standard deviations are included in parentheses.

Group Characteristics of the College-Aged Sample

Sixty-five female college students were included in this portion of the study. Of these college students, only one participant had missing data. This participant failed to complete the Weight Concerns measure but all other data were complete and she was included in the analysis with the missing data replaced by the sample mean as was done with the child sample. College students' ages ranged from 18 to 47 years with an average age of 20.5 years, SD=3.9. BMI for this sample was 23.6, SD=5.3 with range of 15.1 to 55.8. The following describes the self-identified racial make-up of this group: 81.6% Caucasian, 10.2% African American, 3.6% Other, and 2.0% Asian. Mean scores

for the BSQ, Weight Concerns Measure, BIA, and BSQ scores are presented in Table 5. The college sample completed the TCBS, the TIBS, and the WC. They did not complete the ChEAT scale, which is not normed for adults, but completed the BSQ, which is a more standard measure for an adult population. BSQ scores ranged from 34 to 181.

Table 5

Demographic and Body Concerns Measures Means and Standard Deviations for College Students

TCBS	TIBS	WC	BSQ
52.3(16.0)	51.9(13.1)	13.3(5.8)	91.3(37.6)

Note. TCBS is the t score for Current Body Size BIA; TIBS is t score for Ideal Body Size; WC is the Weight Concerns measure; BSQ is the Body Shape Questionnaire. Standard deviations are included in parentheses.

Analysis of Hypothesis #1

Children were administered the BIA, child and preadolescent versions, the ChEAT, and the Weight Concerns measure while the college-aged participants completed the Weight Concerns measure, the Body Shape Questionnaire, and the BIA adult version. Because the content of these measures overlaps, correlation and principal component analysis techniques were used to reduce the number of variables to be used in the data analysis for the child sample while the variables included in the adult sample were reduced using the correlations between the measures. These procedures are described in the following section.

Variable Selection for Children Grades 4th Through 9th

It was hypothesized that these correlations would be high because of the similar content in each of the measures; however, the pattern of correlations was complex. The correlation matrix for these measures is presented in Table 6.

Table 6

Correlations of Body Concerns Measures Scores for Child Sample

	TCBS	TIBS	ChEAT	Ch1	Ch2	Ch3	WC
TCBS	---	.35**	.10	.01	-.03	-.17	.07
TIBS		---	-.19	-.29**	-.06	.11	-.18
ChEAT			---	.88**	.73**	.38**	.64**
Ch1				---	.56**	.11	.70**
Ch2					---	.19	.52**
Ch3						---	-.04
WC							---

Note. *indicates that correlation is significant at the .05 level while ** indicates a correlation is significant at the .01 level. TCBS is the t score for Current Body Size BIA; TIBS is t score for Ideal Body Size; ChEAT is the ChEAT total score; Ch1=Dieting; Ch2=Overconcern with Eating; Ch3=Social Pressure to Gain Weight; WC is the Weight Concerns measure

The correlational pattern is suggestive of three separate factors consisting of the following: The Weight Concerns measure, Dieting subscale of the ChEAT, and the Overconcern with Eating subscale of the ChEAT highly intercorrelated; the BIA subscores correlated with each other and not with the other measures; and, the Social Pressure to Gain Weight subscale of the ChEAT correlating highly only with the ChEAT total score. In order to reduce this data, factor analysis was completed using the Weight Concerns measure, the ChEAT subscale scores, and the BIA subscores. As expected, principal components analysis with varimax rotation produced three factors with eigenvalues exceeding the metric of 1.0. These values were 2.3, 1.3, and 1.2 for factors 1, 2, and 3, respectively. Factor loadings are presented in Table 7.

Table 7

Factor Loadings for Body Shape Preoccupation Measures

	Factor 1	Factor 2	Factor3
TCBS	-.09	**.87**	-.18
TIBS	-.38	**.69**	.43
WC	**.85**	.21	-.18
Ch1	**.89**	.07	-.03
Ch2	**.77**	.16	.26
Ch3	.15	-.15	**.91**

Note. Factor loadings in bold indicate that the variable loads highly on that factor. TCBS is the t score for Current Body Size BIA; TIBS is t score for Ideal Body Size; WC is the Weight Concerns measure; Ch1=Dieting; Ch2=Overconcern with Eating; Ch3=Social Pressure to Gain Weight.

Variables loaded on factors in a manner suggested by the correlation matrix in Table 6. Loadings that met simple structure criterion of .40 or greater on a factor were included in that factor. The TIBS met criteria for both factors 2 and 3 but was assigned to factor 2 because of its high loading (.69) on that factor and its lower (.43) loading on factor 3. Variables that loaded most highly on Factor 1 were Weight Concerns measure, the Dieting ChEAT subscale, and the Overconcern with Body Shape ChEAT subscale. Variables that loaded highly on Factor 2 were the BIA subscores, CBS and IBS. Factor 3 had one variable with a high loading, the ChEAT Social Pressure to Gain Weight subscale. The variables that loaded on Factor 1 include content primarily associated with body and weight concerns as well as dieting behaviors so that factor will be titled Body Shape Concerns. Factor 2 was composed of the two body image subscales and will be termed Body Image. Factor 3 included the Social Pressure to Gain Weight

subscale and was termed Social Pressure to Gain Weight. These factors will be used in the remainder of analyses for the child sample. Adding together the measures that loaded highly on that factor created each factor score. Means and standard deviations for the factor scores by age are presented in Table 8.

Table 8

Means and Standard Deviations for Body Shape Concerns Factor, the Body Image Factor, and the Social Pressure to Gain Weight Factor

	Body Shape Concerns	Body Image	Social Pressure
9	12.3(8.3)	104.4(21.3)	1.5(3.0)
10	12.8(6.4)	103.4(16.2)	1.5(2.5)
11	17.1(10.1)	107.4(15.4)	1.3(2.2)
12	18.4(12.1)	102.2(18.3)	1.2(1.8)
13	16.5(10.9)	122.3(15.9)	1.1(2.5)
14	20.1(12.6)	103.2(21.4)	1.1(1.7)
15	26.7(16.0)	106.5(27.7)	.83(2.0)

Note. Standard deviations are included in parentheses.

Variable Selection for the College-Aged Sample

A correlation matrix for weight concerns measures is presented for the college sample in Table 9. As hypothesized, the majority of the measures were significantly correlated. The BSQ has been used commonly in past research involving cognitive biases and for the purposes of this study is considered the criterion measure. Other variables will be included based upon their correlations with the BSQ. The TCBS and the Weight Concerns measure were significantly correlated with the BSQ and were eliminated from the analysis in order to maximize variability in the proposed regression

analyses. Because of its very low correlation with the BSQ, the TIBS will also be included in the data analysis.

Table 9

Correlations for Body Shape Preoccupation Measures for College Sample

	TCBS	TIBS	BSQ	WC
TCBS	---	.56**	.49**	42**
TIBS		---	.06	.004
BSQ			---	.82**
WC				---

Note. *indicates that correlation is significant at the .05 level (2-tailed) while ** indicates a correlation is significant at the .01 level (2-tailed). TCBS is the t score for Current Body Size BIA; TIBS is t score for Ideal Body Size; BSQ is the Body Shape Questionnaire; WC is the Weight Concerns measure.

Analysis of Hypothesis #2

The relationships between age, pubertal onset, and the body shape preoccupation factors in the child sample were studied using multiple regression analyses. Multiple regression analyses were conducted assessing the association of age and pubertal status with the Body Shape Concerns factor, the Body Image factor, and the Social Pressure to Gain Weight factor. Pubertal status was defined as time since onset of reported menses in months. As pubertal status was not measured in the sample of college students, their data was not included in this analysis. Table 10 presents the correlations between age, pubertal status, and the factor scores. Age and pubertal status were highly correlated with the Body Shape Concerns factor scores, but were nominally correlated with the other factors.

Table 10

Correlations Between the Body Shape Preoccupation Factors, Age, and Pubertal Status

	Body Shape Concerns	Body Image	Social Pressure
Age	.26*	.07	-.09
Pubertal Status	.32*	.001	-.02

Note. * indicates that the correlation is significant at the .01 level (2-tailed).

Three multiple regression analyses were performed in order to determine the relationship between age and months since pubertal onset on each of the factors. Hypothesis #2 postulated that age and pubertal status would be associated with body shape preoccupation in children and adolescents. Age and pubertal status were highly correlated with each other ($r=.68$, $p<.001$) which means that 46% of the variance of each variable is shared by the other. Multiple regression analysis was completed using a backward solution that first produces a solution with the variables forced into a model, then removes variable/s which do not add significant variance. As shown in Table 11, the analysis containing pubertal status and age was significant, accounting for 10% of the variance, but the t score for the age variable was not significant indicating that it did not add a significant amount of variance to the model. A significant model containing pubertal status alone also accounted for 10% of the variance in the Body Shape Concerns factor [$R=.32$; $R^2=.10$; $F(1, 96)=10.6$; $P<.001$; Beta=.29; SE=.09; $\beta=.32$].

The significant positive beta weight for pubertal onset indicated increased time since onset of puberty was associated with increased scores on the Body Shape Concerns factor. Unexpectedly, pubertal status was associated with body shape concerns as defined by that factor score, but age did not contribute significantly to the

model. Another unexpected finding was that age and pubertal status were not associated with the other body preoccupation factor scores. Age and pubertal status were not significantly associated with the Body Image factor or the Social Pressure to Gain Weight factor using the regression procedure.

Table 11

Results of Regression Analysis with Age, Pubertal Status and the Body Shape Concerns Factor

R	R^2	F	Variables	Beta	SE	β	t
.33	.10	5.5 (2, 95)*	Age	.55	.90	.08	.61
			Pubertal Onset	.24	.12	.26	1.99*

Note. * indicates that the analysis is significant at the .05 level.

Analysis of Hypothesis #3

For both samples, it was hypothesized that body shape preoccupation would be associated with content relevant attentional and judgement biases as defined by performance on a Stroop task and the homophones task, respectively. The following section contains these analyses. First, the means by which the Stroop and homophones data were prepared for analysis will be presented. Second, the analysis of the hypothesis for the child sample will be discussed, and finally the analysis of the adult sample will be presented.

Preparation of the Data for Analysis

The data obtained from the child and adult sample data were converted as follows. To analyze Stroop task performance, an interference index was calculated (speed of color naming on target-speed of color naming on control card). This index is a

standard practice in this line of research as a means to control for individual reading level or age differences (Cooper & Fairburn, 1993).

The primary dependent variables on the homophones task were the proportion of body shape related homophones interpretations of the total words presented and the proportion of negatively valenced interpretations. Ratings by one judge were used in the data analysis. Proportions for each of the two scores were created by dividing them by 24 (total number of words presented not including practice words) yielding a proportion score for the body shape interpretations and a score for the negative homophones interpretations. The negatively valenced homophones interpretations contained both negatively valenced body interpretations and negatively valenced interpretations that were not body related. Correlations of these two subratings were nonsignificant, $r=-.01$, $p>.85$, for children and significant, $r=.41$, $p<.001$, for adults. The very low correlation of these subratings in children suggests that they may measure fairly unrelated constructs in that sample. However, in adults the subratings are significantly correlated and shared approximately 16% of their variance. Thus, analysis of these data will include an analysis of the subratings.

A total of three raters judged homophones interpretations in order to calculate intraclass correlations for quality control. Twenty percent of the participants were randomly chosen to be rated by the three judges and included in the reliability calculations; this represents the Model 2 method of intraclass correlation calculations, as described by Shrout and Fleiss (1979). Reliability analyses were performed for both body shape interpretations and the total negative interpretations. Intraclass correlation for body shape interpretations with N=33 and 3 judges was .95 while the correlation for

all negatively valenced interpretations was somewhat lower at .65. As the standard for reliability is ≥.80, these correlations indicate that the body concern judgements were reliable across judges whereas the negative valence judgements did not meet the criteria for interrater agreement (Spats & Johnston, 1989).

Analysis of Cognitive Biases in Children Grades 4th Through 9th

This section contains the analysis of the relationship between body shape preoccupation factors and performance on the Stroop and homophones tasks. Tables 12 and 13 present the mean scores for the dependent variables (i.e., the Stroop practice card, the body shape card, and the animal card by age and the homophones proportions, respectively). Also presented in Table 12 are the means and standard deviations of number of errors made on each card. Participants made very few errors. In analysis of Stroop difference scores, responses to the practice card were not included. A correlation matrix for the body shape preoccupation factors (i.e., Body Shape Concerns, Body Image, and Social Pressure to Gain Weight) and the dependent variables is presented in Table 14. The negative proportions score and one of its subscores, the negative body proportions score were significantly correlated with the Body Shape Concerns factor while the Stroop difference score was significantly correlated with the Social Pressure to Gain Weight factor. These correlations suggest that different aspects of body weight preoccupation may be predictive of judgement versus attentional biases. A canonical correlations analysis procedure was chosen because it allows for the analysis of mutually independent relationships between two sets of variables, one representing independent variables, and the other representing dependent variables. In this case, it

would allow for direct comparison of the attentional and judgement biases to see if both types of biases are associated with the same aspects of body shape preoccupation.

Table 12

Means for Stroop Card Presentations and Stroop Difference Score and Per Card Error

Age	Practice	Target Card	Control	Difference Score
9	36.6(11.3)	51.9 (6.0)	73.4(33.2)	-21.5(31.1)
10	30.8(4.9)	50.9(17.6)	48.1(18.2)	2.7(7.1)
11	28.3(4.4)	38.5(7.0)	39.2(7.1)	-.71(7.4)
12	27.3(6.7)	36.2(7.1)	37.3(10.0)	-1.1(4.8)
13	24.9(4.8)	32.3(8.1)	33.8(7.8)	-1.5(.46)
14	23.8(5.5)	31.1(6.8)	30.7(6.9)	.46(3.0)
15	23.6(4.2)	29.3(5.8)	28.6(5.1)	.67(.90)

Age	Practice Card Error	Body Card Error	Control Card Error
9	.25(.50)	.25(.50)	.25(.50)
10	.33(1.3)	.13(.35)	.20(.56)
11	.42(.83)	.52(1.3)	.78(1.3)
12	.15(.68)	.10(.45)	.31(.82)
13	0.0(0.0)	.40(1.0)	.33(1.3)
14	.20(.52)	.40(.94)	1.2(.50)
15	0.0(0.0	.66(1.0)	.50(.83)

Note. Standard deviations are included in parentheses.

This procedure subsumes factor analysis and regression analysis yielding overall canonical correlations that are interpreted similarly to factors in factor analysis with

loadings generated for each canonical variate, and the correlations themselves are interpreted similarly to a Pearson r meaning that the square of the correlation is the percent of variance shared between the sets of variables.

Table 13

Means and Standard Deviations for Proportions of Body Shape Interpretations of Homophones Task by Age Group

Age	Body	Negative	Negative Body	Negative, Not Body
9	.12(.05)	.02(.01)	.02(.02)	.02(.02)
10	.12(.06)	.002(.01)	.01(.02)	.007(.01)
11	.11(.05)	.01(.02)	.02(.03)	.009(.01)
12	.10(.07)	.02(.04)	.04(.05)	.02(.04)
13	.15(.11)	.03(.03)	.05(.05)	.03(.03)
14	.15(.09)	.02(.03)	.06(.04)	.02(.03)
15	.15(.07)	.01(.02)	.06(.02)	.01(.02)

Note. Standard deviations are included in parentheses. Body is the body shape related interpretations score; Negative is the negative interpretations score; Negative Body and Negative, Not Body refer to the negative interpretations subscores.

In the present analysis, the variables chosen included in one set, the Body Shape Concerns factor, the Body Image factor, and the Social Pressure to Gain Weight factor. The second set consisted of the dependent variables, Stroop difference score, the total body shape homophones interpretation score, and the negative homophones interpretation score. The negative interpretations score as a whole, not the two subscores, was used because of the fairly large participant to variable ratio required to maintain appropriate level of power (Stevens, 1986).

Table 14

Correlations for Body Shape Preoccupation Factors with the Dependent Variables

	Body Shape Concerns	Body Image	Social Pressure
Stroop Diff	-.02	.14	.21*
Body Proportion	.05	-.08	.07
Negative Proportion	.30**	.001	.03
Negative Body	.42**	-.07	.11
Negative, Not Body	-.04	.08	-.09

Note. *indicates that correlation is significant at the .05 level (2-tailed) while ** indicates a correlation is significant at the .01 level (2-tailed). Stroop Diff is the Stroop difference score; Body Proportion is the body shape related interpretations score; Negative is the negative interpretations score; Negative Body and Negative, Not Body refer to the negative interpretations subscores.

The analysis produced three canonical correlations, but only one reached significance (R_1=.32, df=9, p<.04). The significant canonical variate accounted for 9% of the shared variance of the two sets. In general, canonical loadings higher than .50 are considered important (Stevens, 1986). Factor loadings for the canonical variate are presented in Table 15. Of the loadings, only the Body Shape Concerns factor and the negative homophones proportions variables were elevated above criterion. No other significant links were found between the variable sets. Despite the significant correlation between the Social Pressure factor and the Stroop difference score presented in Table 14, the canonical correlation representing the link between the Social Pressure to Gain Weight factor and the Stroop difference score was not significant. The difference in results between the two analyses may be related to the conservative nature of canonical correlation which functions to minimize the Type I error rate while making

it more difficult to achieve significance than did the correlation which was not adjusted to minimize heightened error associated with multiple analyses.

Table 15

Factor Loadings for the Significant Canonical Correlation

Variables	Factor Loadings
Body Shape Concerns	**.95**
Body Image	-.16
Social Pressure	-.25
Stroop Difference Score	-.29
Total Body Proportions	.11
Negative Proportions	**.87**

Note. Factor loadings in bold indicate a significant loading by that variable. Body Shape Concerns, Body Image, and Social Pressure are the three body shape preoccupations scores; Total Body Proportions refers to the body shape related interpretations score; Negative Proportions refers to negatively valenced interpretations.

Hypothesis #3 postulated that heightened body shape preoccupation would be associated with biased processing on the Stroop and the homophones tasks. Using the canonical correlation analysis, a link between negative homophones proportions score and the Body Shape Concerns factor was found; however, as noted earlier, the negative homophones proportions score consists of two fairly independent constructs, the body and non body related interpretations scores. In order to interpret the Body Shape Concerns and negative homophones interpretations score link, regression analyses were performed on both subratings. The Body Shape Concerns factor was significantly associated with the body related homophones proportion score, with the factor scores predicting 17% of the variance [$R=.42$; $R^2=.17$; $F(1, 96)=20.0$; $P<.001$; Beta=.001;

SE=.001; β=.42]. The positive significant beta weight indicated that higher factor scores were associated with a larger number of negative body shape interpretations on the homophones task. Regression analysis involving the Body Shape Concerns factor and negative non body related homophones interpretations was not significant. These regression analyses provide some support for hypothesis #3 with body shape concerns predicting negative body shape interpretations on the homophones task; however, a similar relationship between body shape concerns and an attentional bias for body shape related information on the Stroop task was hypothesized, but not confirmed in this canonical correlation.

Analysis of Cognitive Biases in the College-Aged Sample

Unlike the exploratory analysis of the child data, the hypotheses and analysis of the college-aged sample is based upon past research. As expected given the literature, evidence was found for content relevant attentional and judgement biases on the presented tasks. Sample means for dependent variables are presented in Table 16 and 17. Presented in Table 16 are the means and standard deviations of number of errors made on each card. As expected given the simplicity of this task, few errors were made, on average. A stepwise analysis was performed including the BSQ and the TIBS, with TIBS found to predict 7% of the variance of the Stroop difference score [R=.25; R^2=.07; F (1, 63)=4.50; p<.03; Beta=-.06; SE=.03; β=-.25]. The significant negative beta weight indicated that as preference for a thin ideal increased (i.e., lower IBS t scores), the time to color read the body shape card increases in comparison to the animal card. In the model, BSQ scores were significantly associated with total body related homophones proportion ratings, with BSQ scores predicting 9% of the variance [R=.29;

R^2=.09; F (1, 63)=6.11; P<.05; Beta=.005; SE=.00; β=.29]. Positive significant beta weight indicated that higher scores on the BSQ were associated with a larger number of body shape interpretations on the homophones task regardless of valence.

Table 16

Means and Standard Deviations for Stroop Cards and Stroop Difference Scores

	Practice	Target Card	Control	Stroop Diff
Time	22.3(.3.5)	44.5(5.2)	40.7(5.5)	-1.1(3.5)
Errors/Card	.13(.39)	.04(.21)	.10(.35)	**

Note.**indicates that data does not exist for this variable. Standard deviations are presented in parentheses.

Table 17

Means and Standard Deviations for Body Shape and Negative Interpretations of Homophones Task

Body	Negative	Negative Body	Negative, Not Body
.13(.07)	.08(.09)	.03(.05)	.04(.06)

Note. Standard deviations are included in parentheses. Body refers to the body shape related interpretations score; Negative is the negative interpretations score; Negative Body and Negative, Not Body refer to the negative interpretations subscores.

A third stepwise regression analysis was completed for the negative proportions score. BSQ scores were found to predict 8% of the variance for the negative proportions scores [R=.28; R^2=.08; F (1, 63)=5.21; P<.05; Beta=.007; SE=.001; β=.27]. Significant positive beta weight suggested that an increase in BSQ score is related to increased number of negatively valenced interpretations. In order to provide a comparison with the results the negativity subratings in the sample of children, regression analyses were performed on the body related and non body related negativity ratings, with BSQ and TIBS not significantly associated with either of these subratings.

Analysis of Hypothesis #4

As reported earlier pubertal onset has been found to be associated with the Body Shape Concerns factor in the sample of children. It was also hypothesized that age and pubertal status would be associated with performance on the Stroop and homophones tasks. This analysis, along with the analysis of the hypothesis in the entire sample, is presented in the following section.

Analysis of Age, Pubertal Status, and Cognitive Biases in Children Grades 4th Through 9th

This section presents the analysis of the age and pubertal status factors as predictors of cognitive biases in the child sample. Regression analyses were completed to determine the association of age and pubertal status with performance on the homophones and Stroop tasks. Three multiple regression analyses using a backward solution with age and pubertal status were performed in the same manner as those performed to test hypothesis #2. These variables together predicted 21% of the variance in the negative homophones interpretations score, but the nonsignificant t score for pubertal status presented in Table 18 indicates that this variable did not contribute significantly to the model. The analysis with pubertal onset deleted yielded significant results with age alone predicting 19% of variance in the negative body shape proportions score [$R=.44$; $R^2=.19$; $F(1, 96)=23.1$; $P<.001$; Beta=.01; SE=.003; $\beta=.44$]. Age and/or pubertal status were not significantly associated with the Stroop difference score and the total body shape proportions score. Again, significant effects were not found for the Stroop task with the child sample, but were found with the negative homophones interpretations score indicating only the presence of a judgement bias for

negative information that is associated with age. Effects of age on negative homophones subratings were then analyzed in the entire sample.

Table 18

Results of Regression Analysis with Age and Pubertal Status and the Negative Homophones Interpretations Score

R	R^2	F	Variables	Beta	SE	β	t
.46	.21	12.8(2,95)**	Age	.001	.003	.32	2.6*
			Pubertal Onset	.001	.001	.18	1.5

Note. *indicates that analysis is significant at the .01 level. ** indicates that analysis is significant at .001 level.

Analyses of Age and Cognitive Biases in the Entire Sample

Hypothesis #4 also postulated that age and body shape preoccupation would be associated with biased processing on the Stroop and on the homophones task in the entire sample. For the full sample, analyses were conducted using the Weight Concerns measure, the only measure that was given to all participants. Correlation coefficients between the Weight Concerns measures, age, and the dependent variables are presented in Table 19. The Weight Concerns measure and age were not significantly correlated with each other (.14, $p<.08$), and therefore they were both included in a stepwise regression analysis.

As suggested by the correlations presented in Table 19, regression analyses of Stroop difference score and of body shape homophones interpretations with Weight Concerns and age as predictors were not significant. However, stepwise regression analysis of negative homophones interpretations produced two significant models which are presented in Table 20. In the first model, age alone was found to predict 9% of the variance. The significant positive beta weight indicated that increased age was

associated with increased negative responses to the homophones task. In the second model, age and the Weight Concerns measure were found to predict 14% of the

Table 19

Correlations for Weight Concerns Measure and Age with Dependent Variables for Entire Sample

	Stroop Diff	Body	Negative	Negative Body	Negative, Not Body
WC	-.04	.06	.26*	.30*	.12
Age	.04	.02	.30	.17	.30*

Note. *indicates that correlation is significant at the .01 level (2-tailed). WC is the Weight Concerns measure; Stroop Diff is the Stroop difference score; Body refers to the body shape related interpretations score; Negative is the negative interpretations score; Negative Body and Negative, Not Body refer to the negative interpretations subscores.

Table 20

Regression Analysis for Entire Sample of Homophones Negative Scores with the Body Concerns Measures and Age

Models	R	R^2	F(df)	Beta	SE	β	t
(1)Age	.30	.09	16.2 (1, 161)**	.10	.02	.30	4.0**
(2)Age/	.37	.14	12.8 (2, 160)**	.09	.03	.27	3.6**
Weight Concerns				.07	.02	.22	2.9*

Note. * indicates analysis is significant at the .01 level. ** indicates that analysis is significant at .001 level. (1) refers to the model containing age alone; and, (2) refers to the model containing both age and the Weight Concerns measure.

variance. The significant positive beta weights indicated that increased age combined with increased weight concerns measure score associated with increased negative responses to the homophones task. Stepwise analysis of negative valence homophones subratings yielded significant results. The Weight Concerns measure was found to be predictive of 9% of the variance in the negative body related homophones

interpretations [R=.30, R^2=.09, F(1, 161)=15.6, p<.001, Beta=.002, SE=.001, β=.30]. Age was eliminated from the model. The positive significant beta weight indicated that as level of weight concerns increased the number of negative body shape related interpretations increased. Age was significantly predictive of 9% of the variance in the negative non body related homophones interpretations [R=.31, R^2=.09, F(1, 161)=16.4, p<.001, Beta=002, SE=.001, β=.31] with the significant positive beta weight indicating that as age increased, the number of negative non body related interpretations increased. Overall, results were supportive of hypothesis #4, and were consistent with findings in previous analyses.

Analysis of Effects of Ethnicity

The effects of ethnicity were examined in the entire sample as well as individually within the child and adult samples with no significant effects found for the body shape interpretations, negative body interpretations, or the Stroop difference scores.

Analysis of Order Effects

In order to control for the effects of the order of presentation, three randomized orders were prepared for the homophones word lists, and the presentation of the Stroop task animal and body shape cards were also randomized. ANOVAs were performed investigating order effects for both tasks. In both cases, presentation order was the independent variable with Stroop difference scores and homophones interpretations as the dependent variables. Stroop difference scores did not differ significantly with different presentation order for type of Stroop card, F=(1, 161) .07, p<.79. Body shape

proportions and negative body shape interpretations did not differ significantly by order of presentation [F=(2, 160) .65, p<.52; F=(2, 160) 1.78, p<.17, respectively].

CHAPTER 5. SUMMARY AND CONCLUSIONS

The primary aim of the present study was to investigate the development of body shape related interpretative and attentional biases in pre- and postpubescent children and in adults. A sample of children and a sample of college-aged participants completed an emotional Stroop task as well as an ambiguous homophones task from which were derived a Stroop difference score, a proportions score of total body shape interpretations, and a proportions score for negative body shape interpretations. The participants also completed several measures related to body shape preoccupation. The main results of the study are presented in the following paragraphs.

First, in children, it was hypothesized that body shape preoccupation measures would be moderately to highly correlated. However, the pattern of correlations was more complex and the data were reduced using principal components analysis of the body shape preoccupation measures which produced three factors, the Body Shape Concerns factor, the Body Image factor, and the Social Pressure to Gain Weight factor. The Social Pressure factor consisted of the Social Pressure to Gain Weight ChEAT subscale only which suggests that this subscale measures something separate from body shape concerns and body image issues. Second, we hypothesized that age in conjunction with time since pubertal onset would be associated with performance on the body shape preoccupation measures; however, pubertal status alone was associated with the Body Shape Concerns factor with age not explaining a significant amount of additional variance. Also, neither age nor pubertal status was significantly associated with the other two factors. Third, a canonical correlations analysis of the factors and the cognitive tasks completed by the children revealed only one significant correlation

between the two sets of variables, the Body Shape Concerns factor and the negative homophones proportions score on the homophones task. Specifically, the Body Shape Concerns factor was found to be associated with a homophones bias for negative body shape related information. Although the bias was more specific than hypothesized, the results did provide support for the presence of content relevant biases in children; however, the hypothesized Stroop bias associated with body shape preoccupation was not found. Finally, it was hypothesized that age in conjunction with pubertal status would be associated with performance on the Stroop and homophones tasks. Age alone was found to be significantly associated with negative homophones interpretations scores with pubertal status not explaining a significant amount of additional variance. Age and/or pubertal status were not associated with the other dependent variables. Specifically, it was hypothesized that age and pubertal status would be associated with a body shape related bias on the homophones task, but this was not found. Again, hypothesized results were not found for the Stroop task.

Findings pertaining to the adult sample supported the experimental hypotheses. First, decreased BIA Ideal Body Size t scores were associated with biased processing on the Stroop task; preference for a thinner ideal was correlated with content relevant attentional bias. Second, higher scores on the BSQ were associated with a judgement bias on the homophones task for body shape related information regardless of valence. In contrast to the effects found in the child sample, the body shape preoccupation measure, the BSQ, was not correlated with the negative homophones subratings, but was associated with negative interpretations a whole.

Finally, as was hypothesized, for the entire sample, the Weight Concerns measure was associated with more negative interpretations of the homophones, and with more negative body shape related interpretations, specifically. Age was associated with negative non body related homophones interpretations, but age was not associated with the other dependent variables for the entire sample and the correlation for age and the Weight Concerns measure for the entire sample was low. Again, a Stroop task bias was hypothesized on the Stroop task for the entire sample, but was not found.

Although, interpretive biases were found in both the child and adult samples, the subtle differences in the content of these biases content deserve further comment. Results of analyses for the samples indicate the presence of body shape relevant interpretive biases. Children evidenced a judgement bias specific to negative body shape related material while adults showed a judgement bias for body shape related material regardless of valence. Cognitive trait theories emphasize the influence of schemata, highly-organized content-relevant knowledge structures that guide information processing, in the development of psychopathology. The differences in the results on the homophones tasks between adults and children may represent different stages in the development of these knowledge structures. Schemata develop with experience, infiltrating the layers of cognition with increased cognitive connections so that activation becomes more general and more automatic (Vitousek & Hollon, 1990). Children were biased only to negative body shape related information that was also emotionally salient whereas adults were biased to all body shape related information. Developing schemata in children would also explain the failure to find a Stroop effect in that sample. The homophones task was more ambiguous than the Stroop task and

allowed the children to "read" into the negative emotional content. The adults, responding to body shape related material, in general, across levels of cognitive processing responded with an attentional bias as hypothesized.

Several limitations of the present study should also be addressed. First, in order to complete the study with the child sample, tasks traditionally used with adults to measure attentional and judgement biases were altered to make them developmentally appropriate for the youngest participants. The method and content modifications were based upon past research with children and adults, respectively, and similar methods have been used to confirm cognitive biases in children with high anxiety (Hadwin, et al., 1997). Because the methods presented are an alteration from the standard used with adults, it is in that sample that a methods change would have been expected to interfere with the expected pattern of results. Both attentional and judgement biases were found which suggests that the methods and content were appropriate and valid given the research question. It should also be considered that although modified to be developmentally appropriate for the child sample, it might still not have been appropriate for younger children. Although it was not studied empirically, children in the fourth and fifth grades reported difficulty completing the homophones and Stroop tasks than did the older children. All children included in the study successfully completed it, but increased difficulty performing the tasks may have taxed attentional resources, which may have decreased the saliency of the content relevant information. The alteration in method certainly calls for separate replication to verify the effects found in this study.

Another limitation of the present study was that evidence for a cognitive bias was found using the homophones task for negatively valenced interpretations, but no measures of affective state were administered. The measures were not administered because of objections over exposing the children to the content of such questionnaires from elementary and high school officials. Past research has consistently found a high correlation between measures of depressive symptoms and of body shape preoccupation (Muller, Williamson, & Martin, 1998). Attie and Brooks-Gunn (1989) also found that in preadolescent children body shape dissatisfaction was associated with heightened depressive symptoms. The cognitive mediational theory put forth by Rusting (1998) focuses on the importance of negative mood state on the development of body shape related cognitive biases. Replication of this study, including measures of mood state, is required in order to assess the importance of mood state in the development of cognitive biases in children, as well as to separate the influence of depressive symptoms from those of body shape preoccupation.

The present study replicates previous findings of body shape related attentional and judgement biases in adult participants, but also provides further information about the development of these biases in children and adolescents. The most important conclusions of the present study are that young children with body shape preoccupation did have content relevant judgement biases for negative body related information. These biases are more emotionally specific than the biases found in adults, and this difference may be reflective of changes related to life experience and cognitive development. The issue of cognitive complexity is raised again by the findings on the Stroop task. Adults evidenced an attentional bias for body shape related information, but this bias was not

found in the children. Again, the differences in findings between the adult and child samples may represent changes associated with cognitive development and the salience of specific types of information.

Another important conclusion of the present study is that because of its association between age, pubertal status, and judgement biases in children, the Body Shape Concerns factor appears to represent an aspect of body shape preoccupation that is uniquely relevant to cognitive biases in children. Thus, it may be most effective for use in future research on body related cognitive biases with children. Finally, the presence of cognitive biases in children in relation to the heightened factor score validates the concept of body shape concerns in young children and suggests that these concerns are similar in character to those found in adult samples. Previous research in cognitive biases and the eating disorders has ignored young children, but the appearance of body shape preoccupation in this population suggests that future research must target younger age ranges in addition to adolescents in the development of prevention and treatment programs for the eating disorders. The inclusion of very young children in this research may improve the success of these programs and the success in the prevention of these disorders.

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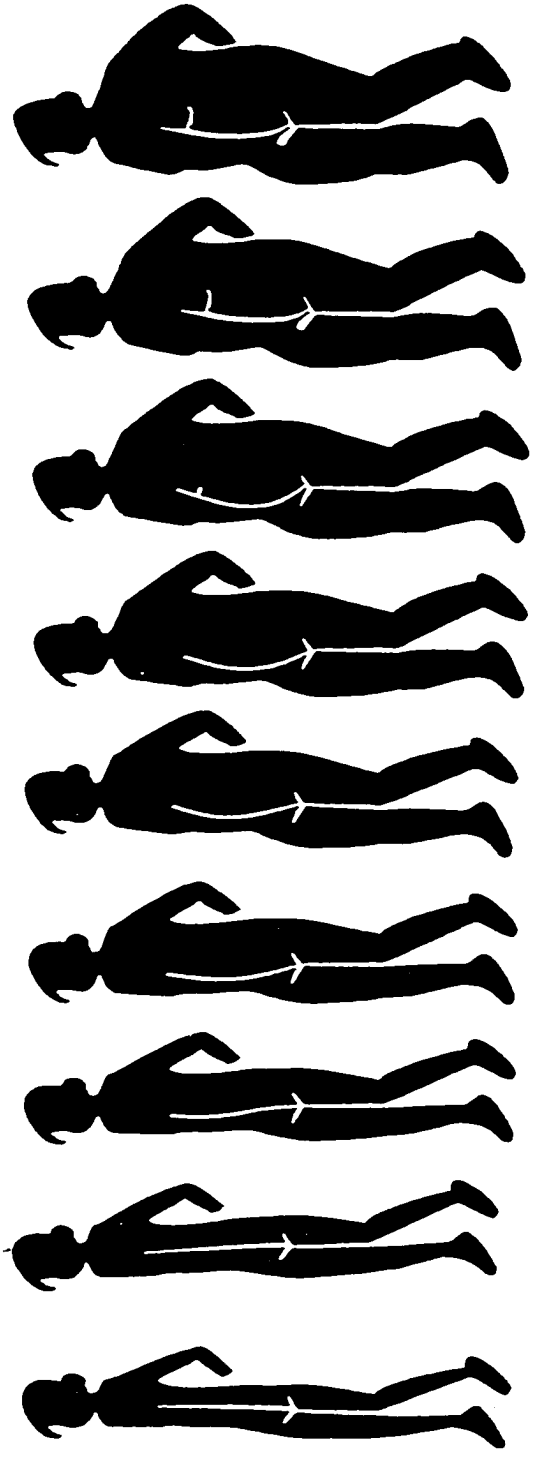
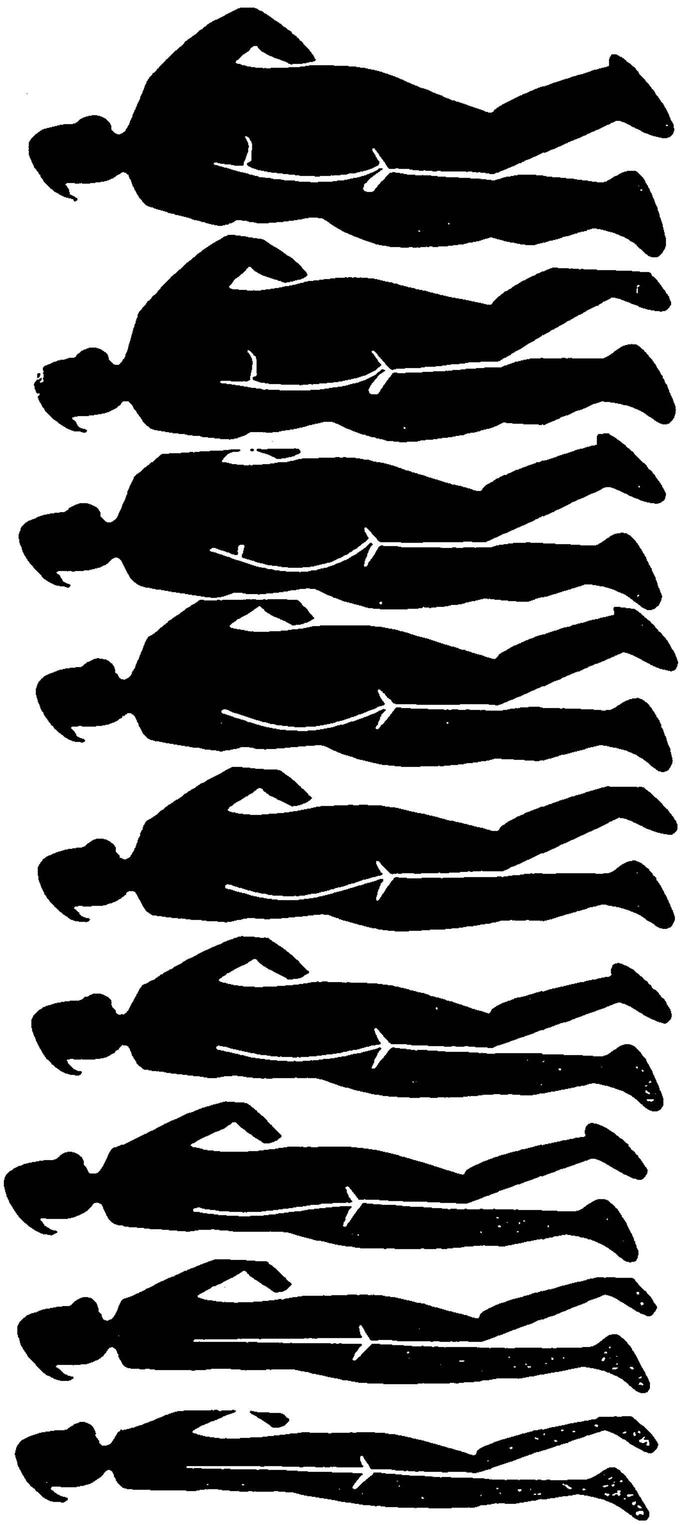
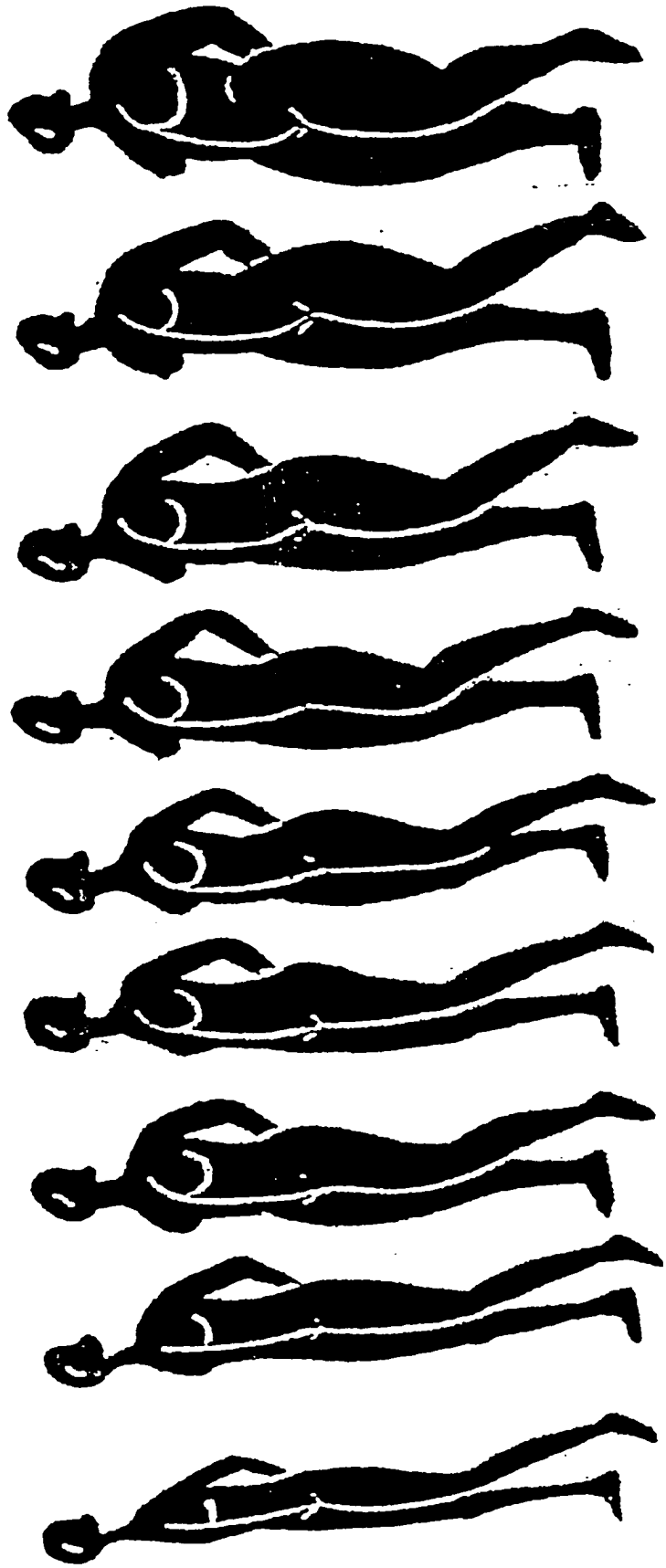
APPENDIX A
BODY IMAGE ASSESSMENTS



BIA-C



BIA-P



BIA-A

APPENDIX B
CHILDREN'S EATING ATTITUDES TEST

Directions: Read each sentence and indicate on the form which word best tells what you think.

1. I am scared of being fat.
   (a)always (b)usually (c)often (d)sometimes (e)rarely (f)never

2. I try not to eat when I am hungry
   (a)always (b)usually (c)often (d)sometimes (e)rarely (f)never

3. I think about food a lot of the time.
   (a)always (b)usually (c)often (d)sometimes (e)rarely (f)never

4. Sometimes I eat a lot and feel like I cannot stop.
   (a)always (b)usually (c)often (d)sometimes (e)rarely (f)never

5. I cut my food into small pieces.
   (a)always (b)usually (c)often (d)sometimes (e)rarely (f)never

6. I know how many calories are in the foods that I eat.
   (a)always (b)usually (c)often (d)sometimes (e)rarely (f)never

7. I think other people want me to eat more
   (a)always (b)usually (c)often (d)sometimes (e)rarely (f)never

8. I feel very guilty after I eat.
   (a)always (b)usually (c)often (d)sometimes (e)rarely (f)never

9. I think about being thinner a lot.
   (a)always (b)usually (c)often (d)sometimes (e)rarely (f)never

10. I think about burning up calories when I exercise.
    (a)always (b)usually (c)often (d)sometimes (e)rarely (f)never

11. Other people think that I am too thin.
    (a)always (b)usually (c)often (d)sometimes (e)rarely (f)never

12. I often think about having fat on my body.
    (a)always (b)usually (c)often (d)sometimes (e)rarely (f)never

13. I take longer than others to eat my meals.
    (a)always (b)usually (c)often (d)sometimes (e)rarely (f)never

14. I try not to eat foods with sugar in them.
(a)always (b)usually (c)often (d)sometimes (e)rarely (f)never

15. I eat diet foods.
(a)always (b)usually (c)often (d)sometimes (e)rarely (f)never

16. I feel that food controls my life.
(a)always (b)usually (c)often (d)sometimes (e)rarely (f)never

17. I can control myself around food.
(a)always (b)usually (c)often (d)sometimes (e)rarely (f)never

18. I feel that others push me to eat.
(a)always (b)usually (c)often (d)sometimes (e)rarely (f)never

19. I give too much time and thought to food.
(a)always (b)usually (c)often (d)sometimes (e)rarely (f)never

20. I do not feel comfortable after eating sweets.
(a)always (b)usually (c)often (d)sometimes (e)rarely (f)never

21. I try to lose weight.
(a)always (b)usually (c)often (d)sometimes (e)rarely (f)never

APPENDIX C
WEIGHT CONCERNS MEASURE

1. How much more or less do you feel you worry about your weight and body shape than other girls your age?

1. I worry a lot less than other girls
2. I worry a little less than other girls
3. I worry about the same as other girls
4. I worry a little more than other girls
5. I worry a lot more than other girls

2. How afraid are you of gaining 3 pounds?

1. Not afraid of gaining
2. Slightly afraid of gaining
3. Moderately afraid of gaining
4. Very afraid of gaining
5. Terrified of gaining

3. When was the last time you went on a diet?

1. I've never been on a diet
2. I was on a diet about 1 year ago
3. I was o n a diet about 6 months ago
4. I was on a diet about 3 months ago
5. I was on a diet about 1 month ago
6. I was on a diet less than 1 month ago
7. I'm now on a diet

4. Compared to other things in life, how important is your weight to you?

1. My weight is not important compared to other things in my life
2. My weight is a little more important than some other things
3. My weight is more important than most, but not all, things in my life
4. My weight is the most important thing in my life

5. Do you ever feel fat?

1. Never
2. Rarely
3. Sometimes
4. Often
5. Always

APPENDIX D
BODY SHAPE QUESTIONNIARE

We would like to know how you have been feeling about your appearance over the PAST FOUR WEEKS. Please read each question and circle the appropriate number to the right. Please answer all the questions.

OVER THE PAST FOUR WEEKS	Never	Rarely	Some times	Often	Very Often	Always
1. Has feeling bored made you brood	1	2	3	4	5	6
2. Have you been so worried about your shape that you have been feeling that you ought to diet?	1	2	3	4	5	6
3. Have you thought that your thighs, hips, or bottom are too large for he rest of you?	1	2	3	4	5	6
4. Have you been afraid that you might become fat (or fatter)?	1	2	3	4	5	6
5. Have you worried about your flesh not being firm enough?	1	2	3	4	5	6
6. Has feeling full (e.g., after eating a large meal) made you feel fat?	1	2	3	4	5	6
7. Have you felt so bad about your shape that you had cried?	1	2	3	4	5	6
8. Have you avoided running because your flesh might wobble?	1	2	3	4	5	6
9. Has being with thin women made you fell self-conscious about your shape?	1	2	3	4	5	6
10. Have you worried about your thighs spreading out when sitting down?	1	2	3	4	5	6
11. Has eating even a small amount of food made you feel fat?	1	2	3	4	5	6
12. Have you noticed the shape of other women felt that your own shape compared unfavorably?	1	2	3	4	5	6
13. Has thinking about shape interfered with your ability to concentrate(e.g., while watching TV, reading, listening to conversations)?	1	2	3	4	5	6
14. Has being naked, such as when taking a bath, made you feel fat?	1	2	3	4	5	6

OVER THE PAST FOUR WEEKS	Never	Rarely	Some times	Often	Very Often	Always
15. Have you avoided wearing clothes which make you particularly aware of the shape of your body?	1	2	3	4	5	6
16. Have you imagined cutting off fleshy areas of your body?	1	2	3	4	5	6
17. Has eating sweets, cakes, or other high calorie food made you feel fat?	1	2	3	4	5	6
18. Have you not gone out to social occasions (e.g., parties) because you have felt bad about your shape?	1	2	3	4	5	6
19. Have you felt excessively large and rounded	1	2	3	4	5	6
20. Have you felt ashamed of your body?	1	2	3	4	5	6
21. Has worry about your shape made you diet?	1	2	3	4	5	6
22. Have you felt happiest about your shape when your stomach has been empty (e.g., in the morning)?	1	2	3	4	5	6
23. Have you felt that it is not fair that other women are thinner than you?	1	2	3	4	5	6
24. Have you worried about other people seeing rolls of flesh around your waist or stomach?	1	2	3	4	5	6
25. Have you felt that it is not fair that other women are thinner than you?	1	2	3	4	5	6
26. Have you vomited in order to feel thinner?	1	2	3	4	5	6
27. When in company have you worried about taking up too much room (e.g., sitting on a sofa or bus seat)?	1	2	3	4	5	6
28. Have you worried about your flesh being dimply?	1	2	3	4	5	6
29. Has seeing your reflection (e.g., in a mirror or shop window) made you feel bad about your shape?	1	2	3	4	5	6
30. Have you pinched areas of your body to see how much fat is there?	1	2	3	4	5	6
31. Have you avoided situations where people could see your body (e.g., communal changing rooms or swimming pools)?	1	2	3	4	5	6

32. Have you taken laxatives in order to feel thinner?	1	2	3	4	5	6
33. Have you been particularly self-conscious about your shape when in the company of other people?	1	2	3	4	5	6
34. Has worry about your shape made you feel you ought to exercise?	1	2	3	4	5	6

APPENDIX E
WORD LISTS FOR STROOP TASK

Stroop

Shape	**Shape Control**
Fat	Dog
Heavy	Cat
Hips	Bird
Stomach	Rabbit
Weight	Monkey

APPENDIX F
WORD LISTS FOR HOMOPHONES TASK

Homophones Task

Body Shape	**Neutral**	**Practice**
Figure	Flashlight	Ladder
Shape	Wind	Wheel
Waist/Waste	Bell	Tractor
Bottom	Money	Mother
Chest	Ball	Tent
Thin	Box	
Behind	Sleep	
Fit	Hat	
	Acorn	
	Stairs	
	Comb	
	Rocket	
	Boot	
	Rope	
	Clock	
	Game	

Practice Words
Ladder
Wheel
Tractor
Mother
Tent

Task Words (Target words in bold)

Order #1	Order #2	Order#3
Flashlight	Flashlight	Game
Wind	**Figure**	**Fit**
Figure	Wind	Stairs
Shape	Bell	Acorn
Bell	**Fit**	Boot
Money	**Shape**	**Thin**
Ball	Hat	**Figure**
Waste	**Behind**	Comb
Box	Sleep	Flashlight
Bottom	Rocket	Sleep
Chest	Boot	Box
Sleep	Game	**Shape**
Hat	Acorn	**Chest**
Acorn	**Thin**	Hat
Stairs	**Chest**	Ball
Comb	Box	Rocket
Thin	Stairs	Rope
Rocket	**Bottom**	**Bottom**
Boot	Money	Clock
Behind	Comb	**Behind**
Rope	Ball	Wind
Fit	**Waste**	**Waste**
Clock	Rope	Ball
Game	Clock	Money

APPENDIX G
DEMOGRAPHICS SHEET

Please answer the following questions:

Grade:_____
Age:_____
Date of Birth:_____
Race: Circle one

Caucasian African American Asian

Native American Other

APPENDIX H
PUBERTAL STATUS QUESTIONNAIRE

Questionnaire #2

Please answer the following 2 questions. Please answer them as well as you can. Remember, we are testing kids in elementary school **and** in high school so not everyone will be the same!

1. Have you started menstruating (your period)?

2. If yes, when was your first period? (please, give a month and year)

3. How old were you?

_____

H_____

W_____

BMI_____

APPENDIX I
FILLER TASK

Please answer these questions. The answer to each question is a particular word. Please guess that word and put the answer in the blank next to the question. Notice that the blanks are made of several small lines. The number of lines is equal to the number of letters in the correct answer.

EXAMPLE: What would you use to hit a home run? _ _ _

The answer is: _ _ _

Try to finish as many as you can!

1. What hangs from the ceiling to cool you down? _ _ _
2. What does your doctor put on a broken leg? _ _ _ _
3. What kind of fuel runs cars? _ _ _
4. What kind of instrument is played in church? _ _ _ _ _
5. What grows on old cheese? _ _ _ _
6. What do you call a gift received on Christmas? _ _ _ _ _ _ _
7. What sound does a duck make? _ _ _ _ _
8. What sound comes from a watch? _ _ _ _
9. Where is your car's spare tire kept? _ _ _ _ _
10. What do you use to write in ink? _ _ _
11. What distance does three feet make up? _ _ _ _
12. When a criminal is found guilty, what does he receive? _ _ _ _ _ _ _ _ _
13. What season occurs after winter? _ _ _ _ _ _

APPENDIX J
CONSENT FORMS

Consent Forms and Parent's Packet
Louisiana State University-Baton Rouge
Consent Form--Students and Parents

1. Study Title: Verbal Knowledge in Girls Grades 4 Through 9.

2. Performance Sites: This study will be completed at the Louisiana University Laboratory School and other schools in the Baton Rouge area.

3. Investigators: Stephanie L. Muller, M.S. 388-1494
Donald A. Williamson, Ph.D. 388-1494

Hours Available: M-T-W 12:00-4:00

4. Purpose of the Study: To investigate how children respond to different vocabulary tests. These responses will be investigated in the context of weight concerns in normal children.

5. Subject Inclusion: A 4th to 9th grade female student currently attending school in the Baton Rouge area that has agreed to participate and whose parent has signed this consent form.

6. Subject Exclusion: Males and individuals not in the 4th through 9th grades and/or whose parents do not agree to allow them to participate.

7. Description of the Study: Participating students will be asked to listen to a list of words on audio tape. They will then write one sentence per word. Students will also be asked to complete a separate task that involves stating ink color of a list of printed words. Participants will also be asked to complete questionnaires that will address vocabulary knowledge, concern for physical appearance, and demographic information. Demographic information will include age, grade, height, and weight. Height and weight will be taken privately. The testing session will take approximately one hour. This testing session will take place during school hours. Also, because the tasks given to the children rely on verbal knowledge, reading comprehension scores on the most recent standardized achievement test given will be requested from your child's teacher.

8. Benefit of the Study: The study will not benefit the participants directly, but will provide relevant information regarding weight concerns in normal children. Participants will also get the opportunity to participate in the research process.

9. Risks: There are no apparent risks from participating in this study.

10. Alternatives: There are no alternatives to this study other than not to participate, which is an option for all students.

11. Removal: There are no criteria for removal from the study other than failure to sign this consent form.

12. Right to Refuse: Participants may choose NOT to participate or to withdraw from the study at any time without penalty.

13. Privacy: The results of this study may be published. The privacy of participating subjects will be protected and the identity of participants will not be revealed unless legally compelled.

14. Release of Information: Records of participants will be reviewed by investigators only, and subject identity will be kept secret.

15. Financial Information: There will be no cost for participation in this study.

16. Signatures:

The study has been discussed with me and all my questions have been answered. I understand that additional questions regarding the study should be directed to investigators listed above. I understand that if I have questions about participant rights, or other concerns, I can contact Dr. Charles Graham, Chairman, Institutional Review Board, at 388-1492. I agree with the terms above and acknowledge I have been given a copy of the consent form.

_____ _____

Your Child's Name Child's Grade/Teacher

_____

Signature of Parent Date

Louisiana State University-Baton Rouge

Assent Form: Students

Study Title: Verbal Knowledge in Girls Grades 4 Through 9.

There are several parts to this experiment. Each of these is described below:

1. Listen to a list of words. Write down a sentence for each word you hear.

2. Say a list of words out loud, timed.

3. You will complete several questionnaires concerning vocabulary knowledge, concern for physical appearance, age, and grade. Included in the demographic information is height and weight that will be measured privately.

I have read the information related to the proposed study. I understand that I will fill out several questionnaires and that my height and weight will be measured. I also understand that I will complete two word tasks. I understand that I do not have to participate in the study if I do not want to, and I can decide not to participate at any time. All of my questions about the study have been answered. By signing this form, I agree to be in the study.

_____

Signature of Student Date

_____

Witness Date

Age_____

Consent Form

Dear Parent or Guardian,

We would like to ask your permission for your daughter to participate in a research project being conducted by Dr. Donald A. Williamson and Stephanie L. Muller, M.S. of the psychology department at LSU. The purpose of this study is to examine how concerns about weight or shape in normal children influence how they complete ambiguous verbal tasks. We hope that information about weight concerns in normal children will help us understand how negative body image develops in adulthood.

What is involved? Girls who participate will be asked to spend about one hour completing several questionnaires. Some of the questionnaires focus on normal weight concerns common in young children while others focus on anxieties that children often report. The girls will also complete two short verbal tasks consisting of ambiguous words that will either have to be read aloud or written into sentences.

Potential benefits and concerns: We will be scheduling the time for the questionnaires to be completed when your child is in PE or study hall.

Participation is voluntary: Your daughter's participation in this study is completely voluntary. There will be no penalty if you do not wish your daughter to be in the study, and she may withdraw at any time during the study even though you have given permission. Permission to conduct the study has been obtained from your daughter's school and the School of Education at LSU.

Information is Confidential: All responses to questionnaires will be kept confidential. We plan to take precautions to ensure that your child's responses are not linked to her. Only the researchers will have access to the data, and the questionnaires will be coded by number, not by name. That means that your child's name will not be on any of the questionnaires. Instead, she will be assigned a number that will be written on the questionnaires and matched to their name on a list. This list will be destroyed after the study is completed. The information collected in this study will only be used for purposes approved by the LSU Institutional Review Board and those stated in this form.

Questions? If you have any specific questions or would like more information before allowing your child to participate, please call Ms. Stephanie Muller at 388-1494.

Thank you very much for your time and consideration. **If you decide to give you child permission to participate, please sign one of the attached consent forms and give it to your child to bring to school. You may keep the other copy.** If your child chooses to participate, she will also be asked to sign an assent form and will be given a copy of it.

Sincerely,
Stephanie Muller, M.S.

APPENDIX K
PRETEST FORM

Age:_____
Gender:_____

Instructions: We need to find out how well kids know this list of words. Each of these words can have more than one meaning. For example, print can mean "to write" or it can mean a type of writing (news print). The first meaning is more common and you might know it better. Here are some words that can have more than one meaning. Each word is presented in a sentence. We want you to rate how common you think that meaning is. Use the rating scale below. Write the number of your rating in the space next to the sentence.

1	2	3	4
Not common at all	Rather Uncommon	Rather Common	Very Common

1. Chest
The pirate opened the treasure chest. _____
2. Fit
Jeff fit the book into the bag. _____
3. Weak
She felt weak. _____
4. Flu
Jessie had the flu. _____
5. Die
She wanted to pick the flowers, but she knew they would die. _____
6. Groan
Carrie dropped a pan on her foot so she let out a groan of pain _____
7. Week
Tuesday is the second day of the work week. _____
8. Flew
The plane flew over Baton Rouge. _____
9. Berry
The gum was berry-flavored _____
10. Dye
Bobbi used dye to make her hair purple _____
11. Patient
The doctor saw his new patient. _____
12. Bark
Tree bark is not good to eat! _____

13. Bottom
Kristy fell to the bottom of the well. _____
14. Waste
Do not waste your food! _____
15. Shape
The boy tried to shape the clay, but it fell
to the floor with a "plop!" _____
16. Build
He was asked to build the lego starship _____
17. Frame
The picture frame crashed to the floor! _____
18. Thin
The painter used water to thin the paint. _____
19. Behind
The fork fell behind the stove. _____
20. Patient
My mom is very patient and kind. _____
21. Bury
The electrician forgot to bury the power _____
lines under the ground.
22. Model
The model airplane was hard to put together. _____
23. Trim
It is fun for the family to trim the Christmas _____
tree.
24. Tone
The music tone was loud, but pretty. _____
25. Joe could not figure out the math
problem. _____
26. Bark
My dog likes to bark. _____
27. Stalk
The lion cub learned how to stalk its prey
from its mother. _____
28. Pig
That pig eats lots of corn. _____
29. Grown
All her children had grown old. _____
30. Stalk
The tractor ran over the plant, crushing
its stalk beneath the tires. _____

Instructions: Some people worry about their weight so they do things like diet or eat low fat foods. I need to know if these words are words that remind **you** of worries related to weight. Please rate the words on how related they are to weight. This can include positive or negative ways to describe a person's body, but it can also include body parts someone might worry about when gaining weight. For each word, rate using the scale below.

For example:

Dog	1
Overweight	4
Toes	1

1	2	3	4
This word is not related to weight at all!			This word Is 100% related To weight or body

1. Figure _____
2. Trim _____
3. Thin _____
4. Shape _____
5. Bottom _____
6. Behind _____
7. Chest _____
8. Tone _____
9. Fit _____
10. Build _____
11. Frame _____
12. Waist _____
13. Pig _____
14. Fat _____
15. Hips _____
16. Weight _____
17. Heavy _____
18. Stomach _____

APPENDIX L
PRETEST DATA

Pretest for Word Stimuli and Selection of Test Words

In order to select the words that would be included in both the homophones and Stroop tasks, 27 male and female children between the ages of 9-11 years old rated several lists of homophones for the subjective familiarity of alternate meanings.

Participants

Twenty-seven male and female children from a local private elementary school were included in the pretest. The pretest was completed as part of library hour for fourth and fifth graders. Parents were informed and signed a consent form for their child's participation. Of the sample, twelve participants were female, and fifteen participants were male. Children ranged in age from 9 years old to 11 years old with mean age being 9.8 years.

Method

Materials

An initial set of 48 words was pretested by a group of 27 9-11 year old male and female children separate from . The initial set consisted of ambiguous threat and body shape related words as well as nonambiguous body-related words used in the Stroop task. All words were chosen from prior published research using similar tasks with children (Green & McKenna, 1993; Hadwin, Frost, French, & Richards, 1997). Words used in the homophone task were pretested for familiarity of alternative meanings. Familiarity of body and shape related words was tested separately in order to avoid writing sample sentences containing those meanings. That task was considered unacceptable for this age group by school officials. Familiarity ratings were taken on a

4-point Likert-type scale with 1=Completely unfamiliar and 4=Totally familiar. The pretest measure is included in Appendix K.

Procedure

Participants were tested in group format. Participants were explained the task, given the packets, and completed the forms. Participants were reminded several times during the task to rate only those meanings they were comfortable enough to use above a 2.5.

Results

Inclusion criteria for each word was a mean familiarity score of 2.5; overall, the majority of words and meanings were rated above 2.5. Only 3 words, all body shape meanings, were rated below the criteria (, *Frame*, *Pig*, and *Tone*; 2.3, 2.3, and 1.9, respectively). The female children rated words as significantly more familiar than did the male children, [Females=3.61 (.31), Males=3.35 (.30); t=(25) 2.18, $p < .04$]. There was not a significant gender difference with body words [Females=3.41 (.34), Males=3.11 (.42); t=(25) 1.95, $p<.06$]. Those words with the highest familiarity ratings were maintained in the final word lists.

Conclusions

The majority of the words used in the pretest were judged as familiar by the children who participated in this pretest. Anxiety or threat related words were included in this pretest and were originally going to be included in the homophones task as a test of content specificity. Although the children did rate familiarity with these words, it was decided to exclude them from the final word lists because they had been rated in past studies by British children and were judged to have less relevance with this American

sample. The final word lists as chosen using the above pretests are included in the Appendices E and F.

VITA

Stephanie Muller attained her bachelor of arts degree with a major in psychology from Marian College in Indianapolis, Indiana in 1993. She graduated *Summa Cum Laude* and was an honors graduate. She attained a master of science degree from Eastern Washington University in 1995 in psychology. Her thesis' title was "Cue Reactivity and Olfaction in Disinhibited Eaters." Ms. Muller is currently finishing her doctoral work in psychology from Louisiana State University with expected graduation date December 2000. Her course of study focused on clinical psychology with a minor in cognitive psychology. The title of her dissertation is "Attentional and Judgement Biases in Weight Preoccupied Children and Adolescents." Ms. Muller was awarded the Alumni Research Fellowship while studying at L.S.U. In her course of study at E.W.U. and L.S.U., Ms. Muller's clinical and research foci were depression, eating disorders, anxiety disorders, and cognition and psychopathology. She presented numerous papers and posters at professional organizations and co-authored several papers in these areas. In August 2000, Ms. Muller completed an internship in the psychiatry department at the University of Alabama at Birmingham.

DOCTORAL EXAMINATION AND DISSERTATION REPORT

Candidate: Stephanie Lynn Muller

Major Field: Psychology

Title of Dissertation: Attentional and Judgement Biases Associated with Body Weight Preoccupation in Children and Adolescents

Approved:

Major Professor and Chairman

Dean of the Graduate School

EXAMINING COMMITTEE:

Jason L. Brick

J McDonald

Mary L Kelley

Diane Burton

Date of Examination:

10/2/00